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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,811	02/23/2004	Guido Burkard	YOR920030615US1	5472

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EXAMINER
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HIRL, JOSEPH P

ART UNIT	PAPER NUMBER
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2129

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/30/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/782,811

**Applicant(s)**

BURKARD ET AL.

**Examiner**

Joseph P. Hirl

**Art Unit**

2129

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date A1, A2.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. Claims 1-26 are pending in this application.

### ***Information Requirement***

2. In accordance with 37 CFR § 1.105, Test data that demonstrates the actual and real operation of the qubit in the manner claimed in this application attesting with measured data to an actual reduction to practice is required.

### ***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Michael A. Nielsen et al, Quantum Computation and Quantum Information applies.

Claims 1-26 are rejected under 35 U.S.C. § 101 for nonstatutory subject matter. The subject claims fail to provide a tangible result with a practical application by either:

- 1) transforming (physical thing); or
- 2) by having the FINAL RESULT (not the steps) achieve or produce  
a useful (specific, substantial, and credible),  
concrete (substantially repeatable/non-unpredictable), and

tangible (real world/non-abstract)

result.

A claim that is so broad that it reads on both statutory and non-statutory subject matter, must be amended. If the specification discloses a practical application but the claim is broader than the disclosure such that it does not require practical application, then the claim must be amended. A claim that recites a computer that solely calculates a mathematical formula is nonstatutory.

The courts have also held that a claim may not preempt ideas, laws or nature or natural phenomena. The concern over preemption was expressed as early as 1852. See Le Roy v. Tatham, 55 U.S. (14How.) 156, 175 (1852) ("A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right."); Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 132, 76 USPQ 280, 282 (1948).

Accordingly, one may not patent every "substantial practical application" of an idea, law of nature or natural phenomena because such a patent "in practical effect would be a patent on the [idea, law of nature or natural phenomena] itself." "Here the "process" claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure-binary conversion. The end use may (1) vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus." Gottschalk v. Benson, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972).

The courts have found that subject matter that is not a practical application or use of an idea, a law of nature or a natural phenomenon is not patentable. As the Supreme Court has made clear, “[a]n idea of itself is not patentable,” Rubber-Tip Pencil Co. v Howard, 20 U.S. (1 Wall.) 498, 507 (1874); taking several abstract ideas and manipulating them together adds nothing to the basic equation. In re Warmerdam, 31 USPQ2d 1754 (Fed. Cir. 1994).

A method that merely limits a qubit to a condition of coupling is not a result that is a practical application. A cubit must be demonstrated as something more than a mathematical object and represent something that is real and not abstract. While the applicant has indicated that a qubit is a logic gate in a quantum computer, applicant has not described how such “logic gate “ is produced. Generally qubits are mathematically objects and one of ordinary skill is searching for effective ways to implement such a mathematical object. Without the “logic gate”, there can be no practical application of a “Method and Structure to Isolate a Qubit from the Environment.” (Nielsen, page 13, lines 5-12).

4. Claims 1, 13 and 23 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Selecting a node where the signal is zero or peak will have no effect on a photron (Nielsen, page 287, line 24) which is chargeless. Hence there will be no opportunity for coupling, the claimed invention will have no function and therefore no utility.¶ 26. applies.

5. Claims 2 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Photons typically operate in the 400 to 750 THZ which is outside the

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operating range of a transmission line and with a physical dimension that precludes the ability to position the qubit properly along the transmission line. . Hence there will be no opportunity for coupling, the claimed invention will have no function and therefore no utility.

6. Claim 3 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Since there can be no coupling (§ 4 above), reading of the state of the qubit will not be possible.

7. Claims 4, 14 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Frequency F01 will be in the GHZ range. A photon qubit is outside of the such range and therefore not capable of representing the claimed limitation.

8. Claims 5, 15 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. §§ 4. and 5. above apply.

9. Claims 6, 16 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. § 4. above applies.

10. Claims 7, 8, 17, 18 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. § 4. applies. The type of transmission line will not make the photon detectable.

11. Claims 9, 10, 19, 20 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. § 4. applies.

12. Claims 11, 21 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. ¶¶ 4 and 6 apply. Impedance matching is of no consequence if the limitation is non functional to the qubit.

13. Claim 12 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Adjusting a ration will not alter the consequences of claim 1.

14. Claim 22 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Separate energy sources will not achieve qubit operation using a transmission line that physically cannot detect the photon.

15. Claims 23 and 25 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Disclosure has not provided teachings of the photon qubit and the minimization of related decoherence.

16. Claim 24 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. ¶¶ 4 and 6 apply.

17. Claim 25 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. The transmission line will have no effect on a chargeless photon.

18. Claim 26 is rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Whatever the frequency is, such frequency defining a location on the transmission line will have no effect on a chargeless photon.

***Claim Rejections - 35 USC § 112***

19. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-26 are rejected under 35 USC 112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a 101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application. This is how the MPEP puts it:

("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35U.S.C. 101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. 101, then the application also fails as a matter of law to enable one of ordinary skill in the art to use the invention under 35 U.S.C. § 112."); In re Kirk, '376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention.**"). See, MPEP 21107.01 (IV), quoting In re Kirk (emphasis added).

Therefore, claims 1-26 are rejected on this basis.

20. Claims 1-26 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The characteristics of a qubit necessary for one of ordinary skill in the art to replicate this invention are not described.



***Claim Rejections - 35 USC § 102***

21. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

22. Claim 23 is rejected under 35 U.S.C. 102(e) as being anticipated by Pitman et al. (USPGPubN 2003/0086138, referred to as **Pitman**)

**Claim 23**

Pitman anticipates at least one qubit (**Pitman**, ¶ 0007); and means for coupling to said at least one qubit in a manner that minimizes a decoherence of said at least one qubit (**Pitman**, ¶ 0016)

***Examination Considerations***

23. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The

Examiner has full latitude to interpret each claim in the broadest reasonable sense.

Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

24. Examiner's Notes are provided with the cited references to prior art to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

25. Unless otherwise annotated, Examiner's statements are to be interpreted in reference to that of one of ordinary skill in the art. Statements made in reference to the condition of the disclosure constitute, on the face of it, the basis and such would be obvious to one of ordinary skill in the art, establishing thereby an inherent prima facie statement.

26. Examiner's Opinion: ¶¶ 23-25 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

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***Conclusion***

27. The prior art of record and not relied upon is considered pertinent to applicant's disclosure.

- Girvin et al, Prospects for Strong Cavity Quantum Electrodynamics with Superconducting Circuits, 2003
- Hennrich et al, Controlled single-photon emission from a Strongly Coupled Atom-Cavity System

28 Claims 1-26 are rejected.

***Correspondence Information***

29. Any inquiry concerning this information or related to the subject disclosure should be directed to the Primary Examiner, Joseph P. Hirl, whose telephone number is (571) 272-3685. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, David R. Vincent can be reached at (571) 272-3080.

Any response to this office action should be mailed to:

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Hand delivered to:

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



Joseph P. Hirl  
Primary Examiner  
March 27, 2007